Inflammation: An all-season phenomenon in human pathology

Gazzetta Medica Italiana - Archivio per le Scienze Mediche
EDIZIONI MINERVA MEDICA

Inflammation: An all-season phenomenon in human pathology

Journal: Gazzetta Medica Italiana - Archivio per le Scienze Mediche
Paper code: Gazz Med Ital - Arch Sci Med-4349
Submission date: February 11, 2020
Article type: Editorial

Files:

1. Manuscript
   Version: 2
   Description: manoscritto
   File format: application/msword

Inflammation:

An all-season phenomenon in human pathology

Giovanni Clemente Actis,[1*] Rinaldo Pellicano,[2] Davide Giuseppe Ribaldone[3]

[1]The Medical Center Practice Office, Turin, Italy

[2]Unit of Gastroenterology, Molinette Hospital, Turin, Italy

[3]Department of Medical Sciences, Division of Gastroenterology, University of Torino, Torino, Italy

Conflicts of interest: none to declare.

[*]Corresponding author: Giovanni Clemente Actis, Medical Center, C.so L. Einaudi 18/A, 10129 Turin, Italy. E-mail: actis_g@libero.it

Key words: autoimmune - environment - inflammasomes

The interest of the scientific community on inflammation has been growing steadily, recently favoring the comprehensive perception of inflammation as a sort of nature's generalized way to cope with the environment.[1] With a group of scientists, we have begun a translational analysis of the evolutionarily conserved process of inflammation. As a result of this work we have elaborated a "Turin concept" of inflammation as an evolutionary and pathologic drift. We have become interested in inflammation because of two main aspects. We first made the point that the clinical presentations (originally comprising the so-called cardinal signs of redness, swelling, and pain) by the end of the 2nd World War have left, as the legacy, a creeping form[2] made of mildly relapsing fever, weakness, and elevated C-reactive protein, somewhat matching the contemporary overgrowth of "autoimmune" affections of a rheumatologic interest.[3] Today, Western Societies are being plagued with such disorders, making important socio-economic issues. On this line, the appreciation of acute/chronic inflammation as an evolutionary carver of life has become of age.[4] Secondly, inflammatory markers have now been found in unsuspected areas including neuropsychiatry.[5] In this case, patient's loss of the acquaintances with the outer world is paralleled by inflammation marking the malaise at the organic level. Notably, inflammation is accredited with both archaic and current negative effects on the central nervous system (CNS). Our ancestors experienced historical phases of cerebral weight loss contextually to waves of inflammation,[6] whereas modern psychiatrists do reckon that inflamed psychiatric individuals are likely to be resistant to standard anti-psychiatric drugs.[7] At the gut level, inflammatory signals cannot be ignored, in view of the crucial role played by the immune system in a barrier organ such as the gut.[8] Examples of these statements might be the puzzling role of the inflammatory post prandial reactions,[9] the double-sword work of the inflammasomes,[10] and the patrolling action of the sub epithelial lymphocytes.[11] On these stages, inflammation is surprisingly being revealed to swing between overt reaction (potentially a host tissue damage) and smart tolerance (protecting host).[12] Moreover, one can only be fascinated by the evidence that the gut immune system is functionally correlated with the

airway lymphocyte circuits[13] through the effects of the still largely unknown microbiome. Wrapping up the notes collected above, one can see inflammation as a universally "magmatic" drift: from time to time permissive conditions may favor its materialization to defined clinical conditions and peculiar consequences. Parodontitis,[14] and, intriguingly enough, *Helicobacter pylori* infection,[15] might originate CNS degeneration with Parkinson's like features; the inflammatory bowel diseases (IBDs)[16] may stem from imbalance of the inflammation physiologically patrolling the borders, and may be at the basis of significant inflammation beyond the same borders;[17] as an accompaniment to psychiatric disorders it may underscore individual's defective adaptation to the surrounding world; all the way to the indolent yet painful malaise of today's mankind.[3]

Finally, we are just at the beginning of the road towards the implication of certain inflammatory markers as spies of our life expectancy. The intellectual icon of inflammation is now steadily approaching that of a gear mediating the two-way directed dialogue between the individual and the surrounding.

References

1. Bennett JM, Reeves G, Billman GE, Sturmberg JP. Inflammation – nature's way to efficiently respond to all types of challenges: implications for understanding and managing "the epidemic" of chronic diseases. Front Med 2018;5:316.
2. Franceschi C, Campisi J. Chronic inflammation (Inflammaging) and its potential contribution to age-associated diseases. J Gerontol A Biol Sci Med Sci 2014;69(Suppl 1):S4-9.
3. Aller MA, Arias N, Fuentes Julian S, Blazquez-Martinez A, Arqudo S, Miguel MP, et al. Coupling inflammation with evo-devo. Med Hypotheses 2012;78:721-31.

4. Actis GC, Pellicano R. Chronic (inflammatory) diseases: precision medicine versus comprehensive understanding? Minerva Med. 2018;109:150-1.
5. Khandaker GM, Dantzer R, Jones PB. Immunopsychiatry, important facts. Psychological Medicine 2017;47:2229-37.
6. Pruimboom L, Raison CL, Muskiet FA. Physical activity protects the human brain against metabolic stress induced by a postprandial and chronic inflammation, Behav Neurol 2015; 2015:569869.
7. Mondelli V, Ciufolini S, Belvederi Murri M, Bonaccorso D, Di Forti M, Giordano A, et al. Cortisol and inflammatory biomarkers predict poor treatment response in first episode psychosis. Schizophrenia Bulletin 2015;41: 1162-70.
8. Branca JJV, Gulisano M, Nicoletti C. Intestinal epithelial barrier function in ageing. Ageing Res Rev 2019;54:100938.
9. Dror E, Dalmas E, Meier DT, Wueest S, Thevenet J, Thienel C, et al. Post prandial macrophage-derived IL-1beta stimulates insulin, and both synergistically promote glucose disposal and inflammation. Nat Immunol 2017;18:283-92.
10. Xue Y, Enosi-Tuipulotu D, Tan WH, Kay C, Man SM. Emerging activators and regulators of inflammasomes and pyro-ptosis. Trends Immunol 2019;40:1035-52.
11. Lan RY, Mackay IR, Gershwin ME. Regulatory T-cells in the prevention of mucosal inflammatory diseases: patrolling the borders. J Autoimmun 2007;29:272-80.
12. McCarville JL, Ayres JS. Disease tolerance: concept and mechanism. Curr Opin Immunol 2018;50:88-93.
13. Loverdos K, Bellos G, Kokolatou L, Vasileiadis I, Giamarellos E, Pecchiari M, et al. Lung microbiome in asthma: current perspectives. J Clin Med 2019;8(11):Pii E1967.

14. Kaur T, Uppoor A, Naik D. Parkinson's disease and periodontitis – the missing link? Gerodontology 2016;33:434-8.

15. Actis GC. *Helicobacter pylori* infection and Parkinson's disease. Min Gastroenterol Dietol 2019;65:164-5.

16. Ribaldone DG, Pellicano R, Actis GC. The gut and the inflammatory bowel diseases inside-out: extra intestinal manifestations. Min Gastroenterol Dietol 2019; 65:309-18.

17. Caviglia GP, Rosso C, Ribaldone DG, Dughera F, Fagoonee S, Astegiano M, Pellicano R. Physiopathology of intestinal barrier and the role of zonulin. Minerva Biotecnol 2019;31:83-92.